

PATENT CLAIMS

1. System for the oxygen delignification of pulp which consists of lignocellulose-containing material and whose mean concentration is 8-18%, which oxygen delignification takes place in
- at least two reaction stages (6 and 10, respectively)
 - with a first addition means (1, 3) for adding chemicals, chiefly oxygen, in a first position prior to the first reaction stage (6) and
 - a second addition means (8, 4, 5) for adding chemicals, chiefly oxygen, in a second position after the first stage and prior to the second stage,
 - where the first reaction stage consists of a reactor (6) having a volume which results in a dwell time of 2-20 minutes, preferably 2-10 minutes, and even more advantageously 3-6 minutes, and
 - where the second reactor (10) has a volume which is at least 10 times greater than the volume in the first reaction stage, i.e. at least 20-200 minutes, preferably 20-100 minutes, and even more advantageously within the range 50-90 minutes,
- c h a r a c t e r i z e d i n t h a t
- the first reaction stage consists of a pipe loop between the first and second addition means
 - the pipe loop is arranged to lie essentially in the same horizontal plane.
2. System for oxygen delignification according to Claim 1,
- c h a r a c t e r i z e d i n t h a t the distance between the first and second addition means is shorter than the length of the pipe loop.
3. System for oxygen delignification according to Claim 2,
- c h a r a c t e r i z e d i n t h a t the length of the

pipe loop is at least 20 metres, preferably in the range 40 metres \pm 10 metres, and in that the distance between the first and second addition means is at least 10 metres shorter than the length of the pipe loop.

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4. System for oxygen delignification according to Claim 2 or 3,

c h a r a c t e r i z e d i n that the pipe loop is drawn in the horizontal plane in a U-shaped bend.

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5. System for oxygen delignification according to Claim 4,

c h a r a c t e r i z e d i n that the highest point (6h) of the U-shaped pipe loop is located at the bottom

15 of the U.

6. System for oxygen delignification according to Claim 4,

20 c h a r a c t e r i z e d i n that the highest point (6h') of the U-shaped pipe loop is located at the downstream, seen in the direction of flow of the pulp, end of the U.

25 7. System for oxygen delignification according to Claim 1, 5 or 6,

c h a r a c t e r i z e d i n that the pipe loop is located, essentially, in the same horizontal plane, and where the difference in height between the lowest and highest points of the pipe loop is less than 2 metres, preferably less than 0.2-1 metre, and in that means for degassing (P, V) are arranged in this highest point of the drawn loop.

35 8. System for oxygen delignification according to Claim 7,

c h a r a c t e r i z e d i n that the means for degassing comprise a controllable degassing valve (V),

from which accumulated air or residual gases can be drawn off from the pipe loop as required, either manually or by way of a control system (P) in dependence on some process parameter.

5 9. System for oxygen delignification according to Claim 7 or 8,

10 characterized in that the means for degassing comprise a local reduction in the area of the drawn loop, which area reduction imparts a locally increased speed of flow to the pulp with the aim of using the ejector effect to entrain accumulated air in the pulp flow.

15 10. System for oxygen delignification according to one of the preceding claims,

20 characterized in that the first addition means for adding chemicals, chiefly oxygen, in a first position prior to the first reaction stage comprises - a first pump (1) which is arranged to pump the pulp to a first mixer (3), which first mixer is arranged in close conjunction with the first pump, and in that the first mixer is a mixer using mechanical agitation, in which the pulp is at least partially fluidized in gaps in the mixer.

25 11. System for oxygen delignification according to one of the preceding claims,

30 characterized in that the second addition means for adding chemicals, chiefly oxygen, in a second position after the first reaction stage and prior to the second reaction stage, comprises

35 - a second mixer (8), which has means for adding steam and which is arranged to receive pulp from the first delignification zone, and where the second mixer is a static mixer without mechanical agitation,
- a second pump (4) which is arranged to receive pulp after the second mixer,

- a third mixer (5), which has means for adding chemicals, principally oxygen, and which is arranged in close conjunction with the second pump, and where this third mixer is a mixer using mechanical agitation, in which the pulp is at least partially fluidized in gaps in the mixer.

12. System for oxygen delignification according to one of the preceding claims,
- 10 c h a r a c t e r i z e d
- in that the system is adjusted in such a way that the pressure in the first reaction stage is essentially constant throughout the reaction stage and amounts to a pressure within the interval 0-6 bar, preferably
 - 15 0-4 bar,
 - in that the second pump (4) has a pumping effect such that the pressure in the second delignification zone reaches a level of at least 3 bars overpressure at the top of the second delignification zone.